SECTION 00875

DEICING SALT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Sodium chloride highway deicing material.

1.2 PAYMENT PROCEDURES

A. Pay for accepted quantities at unit price per ton.

1.3 REFERENCES

A. AASHTO T 27: Sieve Analysis of Fine and Coarse Aggregates.

B. AASHTO T 255: Total Evaporable Moisture Content of Aggregate by Drying.

C. APHA-AWWA-WEF: Standard Methods for the Examination of Water and Waste Water.

D. ASTM B117: Standard Practice for Operating Salt Spray (Fog) Apparatus.

E. ASTM D632: Standard Specification for Sodium Chloride.

F. ASTM D1193: Standard Specification for Reagent Water.

G. ASTM D1411: Standard Test Method for Water-Soluble Chlorides Present as Admixes in Graded Aggregate Road Mixes.

H. ASTM E534: Standard Test Methods for Chemical Analysis of Sodium Chloride.

I. SHRP H-205: Evaluation Procedures for Deicing Chemicals.

1.4 SUBMITTALS

A. For each shipment, supply bill of lading showing:
   1. Type and grade of material
   2. Type and amount of additives
   3. Destination
   4. Consignee's name
   5. Date of Shipment
   6. Truck identification
   7. Net weight in English units
   8. Bill of Lading number
   9. Manufacturer

1.5 DELIVERY, STORAGE AND HANDLING

A. Contamination: Do not supply shipments contaminated with other materials.

1.6 QUALITY ASSURANCE

A. Sampling, supplier-delivered material:

   1. Deliver to specified site.
   2. Notify ENGINEER when delivery is complete.
   3. ENGINEER samples by random one sample for each delivery site per delivery.

B. Sampling, F.O.B. plant material:

   1. UDOT samples stockpile or belt product
   2. Region Materials laboratory conducts tests.

C. Compliance: Supplier pays all UDOT testing costs of non-complying materials.

D. Price Adjustment, Gradation: Downward 25% price adjustment assessed for materials outside specified gradation.

E. Price Adjustment, Moisture Content: Downward 25% price adjustment assessed for moisture content greater than specified.

F. Price Adjustment, General: Products, failing to meet any other specification requirements, are assessed 50% price adjustment or total rejection. Supplier replaces rejected material plus any contaminated material at their cost. Rejected product is removed by the supplier and replaced with compliant product, including handling and transportation charges at no additional cost. Removal

means removing all material contaminated by the non-specification material. ENGINEER establishes the amount of material contaminated.

Two non-compliant shipments per contract year may result in contract termination.

PART 2 PRODUCTS

2.1 DEICING SALT

A. General:

1. Moisture Content: Maximum 3.0% by weight using AASHTO T 255..
2. Melting Activity: Active at 5 ^{o}F ambient temperature. Supplier certifies material meets SHRP H-205.1 for effectiveness.
3. Gradation: Meets the following gradation using AASHTO T 27:

Table 1
Salt Gradation

Sieve Size	Percent Passing
1/2"	100
3/8"	90-100
# 4	75-100
# 8	40-80
# 16	15-45
# 50	0-10

4. Chemical Constituents:

a. Do not supply products containing constituents exceeding total concentration limits listed in 2.1.A.4.b. Test according to methodology listed below. Measure base product concentration levels prior to anti-freeze or chemical adulterant addition.

b. Chemical contaminant limit stated as parts per million (ppm).

Table 2
Allowable Chemical Contaminants

Chemical	**Concentration (ppm)**
Arsenic	5.00
Barium	100.0
Cadmium	0.20
Chromium	1.00
Copper	1.00
Lead	1.00
Mercury	0.05
Selenium	5.00
Zinc	10.00
Phosphorus	2500
Cyanide	0.20

c. Chemical constituent test methods:

1) Total phosphorus as described in "Standard Methods for the Examination of Water and Waste Water", APHA-AWWA-WEF. Total phosphorus shall be determined upon a 1% test solution. The Total Phosphorus value determined from the 1% solution is the value to be reported without being calculated for the dilution. The test solution should be prepared by placing 10 ml of sample into 500 ml of ASTM D1193 Type II distilled water contained in a 1 L volumetric flask to which 2.5 ml 1 + 1 sulfuric acid has been added. Swirl the contents and make up to 1000 ml with distilled water.

2) Total cyanide as described in "Standard Methods for the Examination of Water and Waste Water", APHA-AWWA-

WEF.

3) Total arsenic, barium, cadmium, chromium, copper, lead, selenium and zinc: Atomic Absorption Spectrophotometry or Plasma Emission Spectroscopy as described in "Standard Methods for the Examination of Water and Waste Water", APHA-AWWA-WEF.

4) Total mercury: Cold Vapor Atomic Absorption Spectrophotometry as described in "Standard Methods for the Examination of Water and Waste Water", APHA-AWWA-WEF.

B. Class A Sodium Chloride, Untreated: Minimum 92.0% NaCl by weight using ASTM D1411.

C. Class B Sodium Chloride, Non-Caking: Minimum 92.0% NaCl by weight using ASTM D1411. Yellow Prussiate of Soda (YPS) or other approved chemical is added uniformly to the sodium chloride to produce non-caking material when subjected to the following test:

Material is exposed to two (2) twenty-four (24) hour moisture cycles from 3% minus moisture by weight to 25% plus moisture and back to 3% moisture.

Add pre-approved anti-caking agent prior to stockpiling. Anti-caking agent addition produces a uniform coating throughout stockpile.

D. Class C Sodium Chloride, Freeze Resistant: Minimum 92.0% NaCl by weight using ASTM D1411. Includes anti-caking agent as specified for Class B. Additional approved chemicals are added to depress freezing point of the salt in the stockpile to 0^{o} F. Add anti-freeze chemicals uniformly prior to stockpiling. Submit freeze point depressant chemical additives and method of introduction.

E. Class D Sodium Chloride, High Performance Grade: Minimum 92.0% NaCl by weight using ASTM D1411. May include anti-caking agent. Meets Class C Sodium Chloride specification. Measure performance compared to bakers grade sodium chloride. Test at 25°F, 20°F, and 5°F.

1. Melting power exceeds bakers grade salt by 100% total volume melt using SHRP H-205.1 at 5°F.

2. Melting power exceeds bakers grade salt by 50% total volume melt using SHRP H-205.1 at 25°F.
3. Ice penetration exceeds baker's grade sodium chloride by 60% in one hour using SHRP H-205.5 at 20°F.
4. Corrosiveness is 50% less corrosive than bakers grade sodium chloride measured using ASTM B117.
5. Color is discernibly dark, distributed homogeneously throughout entire granule, non-fading, and non-leaching.

F. Testing Cost: Supplier pays costs incurred in procuring and testing materials found outside specification.

PART 3 EXECUTION

3.1 DELIVERY

A. Deliver to locations listed on the bid schedule between 8:00 AM and 5:00 PM, Monday through Friday, except state holidays. Notify station supervisor twenty-four hours prior to delivery. Unload material where directed by Engineer.
1. Delivery Method One: Deliver using end-dump trucks only. No Trailers.
2. Delivery Method Two: Deliver using end-dump trucks, end-dump trucks with pups, or end-dump trailers.
3. Delivery Method Three: Deliver using end-dumps, end-dumps with pups, end-dump trailers, side dumps, or belly dumps.
4. Delivery Method Four: Load state trucks F.O.B. at supplier's production facility, stockpile, railhead, or other designated location. Supplier specifies point of delivery in writing if other than normal place of business.

B. Stockpiles: The method for stockpiling sodium chloride is specified for each station. The method will be one of the following:
1. Method 1: Stockpile by butting loads – Build stockpiles at designated locations. Butt loads one against the other in such a manner as to occupy as small a total stockpile area as possible. If the supplier elects to use belly dumps or pups, he must supply equipment to keep the stockpile pushed up to cover an area no larger than a stockpile area produced by an end-dump. If Engineer is not satisfied with the stockpiling, supplier reshapes the stockpile to an acceptable configuration. If UDOT personnel reshape the stockpile, the cost of reshaping is deducted from the contract.
2. Method 2: Stockpile by supplier furnished loader – Build stockpiles at designated locations. Supplier places each load and load is "bucked up" using a supplier-furnished loader and operator. Stockpiles occupy as little space as possible and are bucked up to a uniform 10-foot height. If

Engineer is not satisfied with the stockpiling, supplier reshapes the stockpile to an acceptable configuration. If UDOT personnel reshape stockpile, reshaping cost is deducted from the contract.

3. Method 3: Stockpile by state forces shaping pile – Build stockpile at designated locations. State forces shape stockpile.

C. Complete delivery of each order placed after October 31st within two calendar days of order receipt.